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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/679,985	10/06/2003	Dzhakhangir V. Khaydarov	04379/000M882-US0	4773
7278	7590	09/21/2005		
DARBY & DARBY P.C. P. O. BOX 5257 NEW YORK, NY 10150-5257			EXAMINER UNELUS, ERNEST	
			ART UNIT	PAPER NUMBER
			2828	

DATE MAILED: 09/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/679,985

Applicant(s)

KHAYDAROV, DZHAKHANGIR V.

Examiner

Ernest Unelus

Art Unit

2828

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 10/06/2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>10/06/2003</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 4, 6, 7, 8, 9, 10, 13, 15, 17, and 18-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jiang et al. (6,252,892) in view of Kalyanaraman et al. (4,854, 6 76), Birnbaum (5,802,083), and further in view of Keller (5,345,454).

With respect to claims 1, 4, 8-10, 13, 15, 18, and 20-21, in Fig. 6, Jiang discloses a laser defining a cavity between proximal end (42a) and distal end (38a) with a beam pathway between which passes through solid state gain medium (10a). A source of pump energy (14a) (not shown) enters the system through coupler (18a). Outputting means for the light is reference numeral (22a), and beam-limiting splitter is denoted by reference numeral (64a). A saturable absorber, which is comprises of a solid state, is denoted by reference numeral (34a), and the passive negative feedback element is denoted by reference numeral (35a). Jiang fail to specifically discloses the pulse power range and the absorption recovery time. However, the pulse power range, is taught by Kalyanaraman in column 11, line 4, indicating there is no novelty associated with pulse power range. He also include a 30 picoseconds pulse with the energy of 200 microjule per pulse. Concerning the

limitations of the saturable absorber recovery time, one of ordinary skill in the art would immediately recognize this limitation as being descriptive of a slow saturable absorber material. In column 2 lines 2-12, Birnbaum describes slow saturable absorbers. Note, in this passage Birnbaum is reciting this limitation in a different wording that one of ordinary skill would immediately recognize. It would be obvious to one of ordinary skill in the art to use a laser with pulse duration simple to increase light intensity. It would also be obvious to one of ordinary skill in the art to use a slow saturable absorber or a SA recovery time to attained low order transverse mode which results in minimum diffraction of the laser beam. Concerning the limitations of the orientation and a location of the SA element is variable and wherein the output pulse duration can be varied by varying at least one of the orientation and location of the SA element. Jiang Kalyanaraman, and Birnbaum teach all elements of the claim inventions above. Jiang, Kalyanaraman, and Birnbaum fail to specifically discloses that the orientation of the SA element can be selected to be one of a plurality of orientations between a first and a second angle approximately 45 degree to a polarization of the beam in the beam pathway. However, Keller discloses that the orientation of the SA element can be selected to be one of a plurality of orientations between a first and a second angle approximately 45 degree to a polarization of the beam in the beam pathway (Keller col. 5, lines 59-68 to col. 6, lines 1-31) see figure 4. It would be obvious to one of ordinary skill in the art to use this structure for continuous wave when combined with a gain medium and a reflector to use a slow saturable absorber for mode-locking.

With respect to claims 6-7, and 17-18, Jiang discloses what is claimed above in addition to the SA element being arranged between the proximal reflective surface and the means for providing an energy output from the cavity (col. 8, lines 40-50)

Claims 2, 3, 14, and 24, are rejected under 35 U.S.C. 103(a) as being unpatentable over Jiang et al. (6,252,892) in view of Kalyanaraman et al. (4,854, 6 76), Birnbaum (5,802,083), Keller (5,345,454), and further in view of Diels et al. (5,175,664).

With respect to claims 2, 3, 14, and 24, Jiang, Kalyanaraman, Birnbaum, and Keller teach all elements of the claim inventions above. Jiang, Kalyanaraman, Birnbaum, and Keller fail to specifically disclose that the output pulse duration can be varied from about 20 picoseconds to about 200 picoseconds. However, Diels teaches that there are passive negative feedback stabilized Q-switched lasers with these pulse characteristics (Diels, col. 3, lines 50 – 55). It would be obvious to one of ordinary skill in the art to use this property to establish a reliable laser system capable of producing intense picosecond pulses with a low shot to shot standard deviation.

Claims 5 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jiang et al. (6,252,892) in view of Kalyanaraman et al. (4,854, 6 76), Birnbaum (5,802,083), Keller (5,345,454), and further in view of Heilweil (4,980,566).

With respect to claims 5 and 16, Jiang Kalyanaraman, Birnbaum, and Keller

teach all elements of the claim inventions above. Jiang, Kalyanaraman, Birnbaum, and Keller fail to specifically disclose the laser medium comprising an Nd³⁺YAG crystal. However, Heilweil teaches the properties of Nd³⁺YAG laser gain mediums are well known, and widely used in picoseconds regime pulsed lasers. Heilweil is but one example of such a system (see Heilweil column 3 lines 24 - 26 and Fig. 1A). It would be obvious to one of ordinary skill in the art to use this property to shorten the pulse duration and to stabilize the output pulse train of an active passive mode locked Nd³⁺YAG cavity.

Claims 11 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jiang et al. (6,252,892) in view of Kalyanaraman et al. (4,854, 6 76), Birnbaum (5,802,083), Keller (5,345,454), and further in view of Govorkov et al. (6,002,697).

With respect to claims 11 and 22, Jiang, Kalyanaraman, Birnbaum, and Keller teach all elements of the claim inventions above. Jiang, Kalyanaraman, Birnbaum, and Keller fail to disclose a SA element comprises a Cr⁴⁺: YAG crystals. However, Govorkov teaches a saturable absorbers made of Cr⁴⁺: YAG crystals are well known and widely used (col. 3, lines 61-65). It would be obvious to one of ordinary skill in the art to use this property to produce short energetic pulses.

Claims 12 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jiang et al. (6,252,892) in view of Kalyanaraman et al. (4,854, 6 76), Birnbaum (5,802,083), Keller (5,345,454), and further in view of Rand (4,833,333).

With respect to claims 12 and 23, Jiang, Kalyanaraman, Birnbaum, and Keller teach all elements of the claim inventions above. Jiang, Kalyanaraman, Birnbaum, and Keller fail to disclose a SA element comprises a LIF: (F2) color center crystal. However Rand teaches that LIF: (F2)- color center crystals are a well known saturable absorber (column 1 lines 52 – 58), and it would be obvious to one of ordinary skill in the art to use the color center crystal to delay the time at which the laser reaches threshold by absorbing a fraction of the growing intracavity field on each pass.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1 and 4, 2, 3, 5, 6, 10, 11, 12, and 13 provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 34, 29, 3, 6, 7, 9, 14, and 40 of issued patent number 6,546,027. Although the conflicting claims are not identical, they are not patentably distinct from each other because they disclose similar limitations;

Regarding claims 1 and 4, patent number 6,546,027 stated a laser defining the cavity housing a proximal reflective surface, a distal reflective surface, a beam pathway there between, and, along the beam pathway, a solid-state laser medium, a source of pulsed energy for energizing the laser medium, means for providing an energy output from the cavity, and a beam-limiting element, the laser comprising: a passive negative feedback (PNF) element arranged along the beam pathway; and a saturable absorber (SA) element arranged along the beam pathway for Q-switching the laser, said SA element having an absorption recovery time which is longer than an output pulse duration, wherein at least one of an orientation and a location of the SA element is variable and wherein the output pulse duration can be varied by varying at least one of the orientation and location of the SA element and laser produces at least one output pulse having an energy of from about 100 microjoules to about 2mJ (see claim 1). Regarding claim 2, patent number 6,546,027

Art Unit: 2828

stated the output pulse duration can be varied from about 20 picoseconds to about 200 picoseconds (see claim 34). Regarding claim 3, patent number 6,546,027 stated the output pulse duration can be varied by a factor between 1 and 20, inclusive (see claim 29). Regarding claim 5, patent number 6,546,027 stated the laser medium comprises a Nd: YAG crystal (see claim 3). Regarding claim 6, patent number 6,546,027 stated the SA element is arranged between the proximal reflective surface and the means for providing an energy output from the cavity (see claim 6). Regarding claim 10, patent number 6,546,027 stated the SA element comprises a solid-state element (see claim 7). Regarding claim 11, patent number 6,546,027 stated the SA element comprises a Cr: YAG crystal (see claim 9). Regarding claim 12, patent number 6,546,027 stated the SA element comprises a LiF:(F2)- color center crystal (see claim 14). Regarding claim 13, patent number 6,546,027 discloses a method of varying a duration of an energy pulse output from a laser, the laser defining a beam pathway therein and housing a solid-state laser medium and a source of pulsed energy for energizing the laser medium, the method comprising: providing a passive negative feedback (PNF) element along the beam pathway; providing a saturable absorber (SA) element along the beam pathway for Q-switching the laser, the SA element having an absorption recovery time which is longer than an output pulse duration; and varying at least one of a position and an orientation of the SA element, whereby the output pulse duration is varied (see claim 40).

This is a provisional obviousness-type double patenting rejection because the

conflicting claims have not in fact been patented.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Weingarten et al. (US Pat. 6,393,035) discloses a Jiang discloses a laser defining a cavity between proximal end and distal end with a beam pathway between which passes through solid state gain medium . A source of pump energy (not shown) enters the system through coupler, an outputting means for the light a beam-limiting splitter a saturable absorber, and passive negative feedback element with the exception of the absorption recovery time.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ernest Unelus whose telephone number is 571-272-0218. The examiner can normally be reached on 9:00am to 5:00 pm.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minsun Harvey can be reached on 571-272-1835. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For

Art Unit: 2828

more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

E.U


ZANDRA V. SMITH
PRIMARY EXAMINER